



The Population Educator

Teacher Training and Resources from Population Connection

The Price of Oil

Last April, a British Petroleum (BP) oil rig exploded, killing 11 people and spewing roughly 206 million gallons of oil into the Gulf of Mexico until it was temporarily capped in mid-July.¹ Currently, crews are drilling the final feet of the relief well, albeit sporadically due to the tropical storms coming through, which hopefully will permanently stop the leaking oil from BP's busted pipes. Imagine how big 206 million gallons of oil really is. If you put it in a line of one gallon buckets, it would stretch across the United States 6.7 times. It would fill up Shamu's tank at Sea World over 29 times. It would fit into a 47 story high tank the size of a football field.

The spill has fisheries and tourism stopped in their tracks while billions of dollars are spent trying to halt oil flow and salvage the fragile coastal ecosystem. Nothing warns of the dangers of our dependence on fossil fuels quite like the devastating effects this spill has had on the environment and economy in the region. These effects have been much more costly than just the price of gas at the pump.

Environmental Costs

The oil spill has completely altered the complex ecosystem of the Gulf of Mexico. Animals from this region

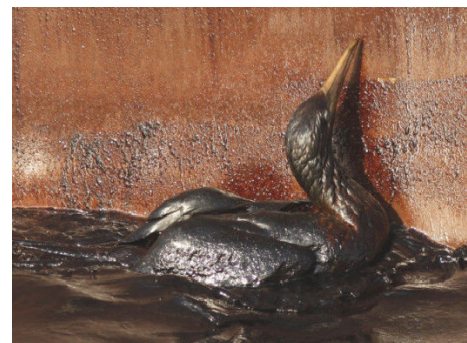
include 28 species of marine mammals and five species of endangered sea turtles, along with marine birds and economically important fish species. Oil causes several hazards for this wildlife: poisoning from eating or touching the oil, the break-down of insulation, and damage to reproductive systems and behaviors.² Animals that live in the wetlands region are particularly vulnerable, as this area acts as a nursery for young birds and juvenile fish.

Oil not only causes problems with wildlife, but it also pollutes the habitat in which they live. Even the clean-up efforts can contaminate ecosystems, as chemicals used to break down oil can be absorbed into the food chain and are toxic to animals. The lesson provided in the *Activity* section of this newsletter, ***Like Oil and Water***, is a great way to demonstrate to students the effects of oil in the ocean and the difficulties of the clean up. Another lesson on how humans can better manage our ocean ecosystems is ***A Drop in the Ocean***. Both of these activities can be found in our *Earth Matters CD*.

Economic Costs

Economic problems are equally harmful and can affect people hundreds of miles from the spill. BP lost \$67 billion, more than a third of its market value, within just one month of the spill, along with billions of dollars in clean-up costs.

The 14 million people who live in coastal communities in Louisiana, Mississippi, Alabama, and Florida



are feeling the blow of the oil as well. In Louisiana alone, at least 27,000 jobs rely on the fishing industry, bringing in about \$2.7 billion a year.³ According to the Worldwatch Institute, the Gulf of Mexico produces one-fifth of the entire US fish catch, providing nearly \$662 million annually.⁴ Unfortunately, the normal catches of oyster, blue crab, and finned fish have been halved, and the catch of shrimp is down to only 25% as fishermen are being restricted with a no fishing zone on 22% of the Gulf.⁵ This will affect seafood costs throughout the U.S, as well as other markets from abroad as they step in to fill the gaps for which U.S. fishermen can't provide.

Societal Costs

Fishermen have lost their livelihoods for the time being as they wait for the Gulf to open up again, and there is a wave of uncertainty about whether fish stocks will ever be able to recuperate from this kind of massive habitat destruction. For citizens on the coast of Louisiana who had just begun to piece together their lives again after the devastation of Hurricane Katrina, this is particularly painful. Many have

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called this area home for decades, and the destruction has effects on economic prosperity, human health, and the local cultural fabric which relies so heavily on fishing.

These environmental, economic and social costs are heavily interlinked. One example of this is the Atlantic bluefin tuna, a highly migratory fish species that reproduces in the Gulf of Mexico and then travels annually through the northeast Atlantic and into Northern Europe. The market for this fish is extremely high, with one fish selling for \$3,000 or more. Because of this high price, fishermen throughout the U.S. and Western European countries rely on this catch for income. Since the species has already been depleted significantly due to overharvesting, this oil spill could be the last straw in their survival, leaving hundreds of fishermen without an income. As this instance shows, an environmental problem in one region of the U.S. can easily become a social and economic problem for fishermen in other parts of the world. Visual lessons to show these connections are ***Everything is Connected*** and ***Who Polluted the River?*** both of which can be found on our website at www.populationeducation.org under Teaching Materials and Tools.



What You Can Do

According to the U.S. Energy and Information Administration (EIA), the population of the U.S. alone owns 246 million cars consuming 19,498,000 barrels of petroleum every day; that's enough fuel to drive around the world 1,228 times!⁶ As world population quickly approaches seven billion, our oil consumption continues to increase. As the Gulf spill shows, energy needs of our growing population are causing us more harm than help. To illustrate this to your students, use ***Are People the Problem?*** from our *Earth Matters* CD to help students understand how energy consumption and population are linked.



We can all make conscious choices to reduce our personal oil consumption. Alternative methods of transportation, such as biking, walking, or taking public transportation decrease the amount of oil used per person. If these methods aren't possible, try carpooling with a friend to work. Also, global markets are recognizing the need to cut down on oil use and making more fuel efficient cars. Hybrid cars run partially on electricity, with certain models getting nearly double the gas-mileage of an average car. By making just a few easy changes, you can help to reduce global oil consumption and the likelihood of another catastrophic spill. To get students to make connections between transportation and fossil fuel use, check-out ***Transportation Tally*** found on our *Teaching Population* CD or ***Getting Around*** found in *Earth Matters*, 3rd edition.



Sources:

¹ Pfeiffer, Sylvia and Sheila McNulty. (August 2, 2010). "BP Oil Spill Confirmed as 'world's worst.'" *Financial Times*.

<http://www.ft.com/cms/s/0/3e40d4ac-9e5d-11df-a5a4-00144feab49a.html?ftcamp=rss>

² Embach, Carolyn (2010). "Oil Spills: Impact on the Ocean." Retrieved from:

<http://www.waterencyclopedia.com/Oc-Po/Oil-Spills-Impact-on-the-Ocean.html>

³ McKinley, J.C. (2 June, 2010). "Fishermen Wait on Docks as Oil Gushes." *New York Times*.

<http://www.nytimes.com/2010/06/03/us/03seafood.html?hp>

⁴ Halweil, B. & D. Nierenberg. "Meat and Seafood: The Global Diet's Most Costly Ingredients." *State of the World 2008*. Worldwatch Institute. New York: W.W. Norton & Company, 2008. pg. 63.

⁵ NOAA Fisheries Service. http://sero.nmfs.noaa.gov/deepwater_horizon_oil_spill.htm (Accessed August 23rd, 2010)

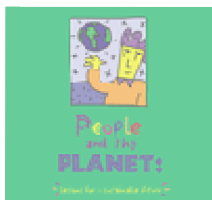
⁶ US Energy Information Administration. "Petroleum Basic Statistics." Retrieved from: <http://www.eia.doe.gov/basics/quickoil.html>



Resources



People and the Planet Updated Now!



Population Education's middle school curricula, *People and the Planet*, is now updated! Through four units and 33 hands-on, interdisciplinary activities, students explore the interconnections of human population growth, natural resource use, social justice, and much more. The new 3rd edition is complete with the most current population statistics from the most reliable sources. By inspiring students to "think globally and act locally," *People and the Planet* is a must-have for every middle school classroom! To get your updated copy today for just \$13, visit www.populationeducation.org or call 1-800-767-1956.



World of Seven Billion in 2011

Student Contest and New Lesson Plans this Fall

While it's only been 11 years since world population reached six billion, we're expected to reach seven billion next fall! As a way to show how this population marker can be a teachable moment in your classrooms, Population Education is launching a "World of 7 Billion" Campaign starting in September. Through this campaign, we will provide free lesson plans to teachers and host a video public service announcement (PSA) contest where students can submit videos that emphasize how a population of seven billion people is affecting our planet. This is a great way for students to do research on these topics and potentially win prizes, too! Look out for more information that will be posted on our website, www.Worldof7Billion.org, starting in September.



Population Education Goes to Niger!



Starting this year, Population Education is partnering with the Peace Corps volunteers in Niger to bring Population Education materials into Africa. Niger has a high need for population education, with each woman having an average of 7-8 children and a GNI of only \$680 per person. Through this pilot program started by a former Peace Corps volunteer, our resources have been adapted for cultural relevance and translated into French, Hausa and Zarma for use in schools and community groups. We hope to see this project develop in the coming year as we continue growing the program.



2010 World Population Data Sheet

A great tool for teachers looking for interesting, up-to-date population statistics is the *World Population Data Sheet* that comes out every year from the Population Reference Bureau. The 2010 version is now available for download on the website, www.prb.org. Download it today for relevant information to supplement our lesson plans.



Activity

Like Water and Oil

Introduction

The recent Gulf of Mexico oil spill has drawn national attention to the many effects of oil on people and ecosystems. This lab allows student to conduct experiments to understand these consequences, and how people contribute to the clean-up.

Procedure

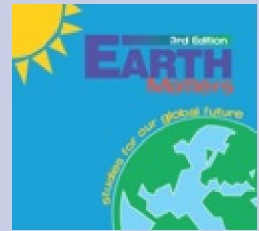
1. Divide the class into groups of three or four students. Each group needs a shallow pan partially filled with water, a small beaker with colored vegetable oil, a piece of string and a copy of the student worksheet. Instruct students to complete part 1 on their worksheets (How does an Oil Spill Spread?)
2. Have the students examine the effects of an oil spill on a bird's feathers, following the directions on the student worksheet for Part 2 (Birds and Oil). Each group will need a feather, some liquid detergent, and a toothbrush in addition to their materials from Part 1.
3. Have students work through Part 3 on their worksheets (Cleaning Up the Spill). Have supplies of the clean-up materials listed above out on a table. Each team may choose one or two items to try to clean up their oil spill.

Discussion Questions:

1. If left alone, how does oil spread out?
2. What effects do waves have on the spill? What is the effect of wind?
3. What do your experiment results tell you about the effects of oil spills on marine birds? What other wildlife do you think might be affected?
4. What can we do to reduce the impact of oil on marine life?
5. In what ways might humans be directly affected by oil spills?
6. Discuss the students' results from Part 3 as a class. Were there some materials that worked better than others?

Follow-up Activities

1. Have the students research a large oil spill in recent history. These could include the recent spill in the Gulf of Mexico, the Exxon-Valdez spill in 1989, or the spill in the Persian Gulf in 1991. Ask them to write an essay or newspaper article about the incident, including causes of the spill, extent of oil coverage, effects on the local environment, and efforts to contain and clean-up the spill.
2. Although this activity looked at how oil affects birds, other wildlife is also at risk. Have students research how oil affects marine mammals, fish, and other organisms and write a short essay of their findings.



Concept:

Human actions, such as oil spills, pollute the ocean environment and can cause devastating effects for marine wildlife.

Objectives:

Students will be able to:

- Conduct scientific experimentation on the effects of oil spills.
- Analyze data and draw conclusions from the results of their research.

Subjects:

Biology, environmental science, mathematics, social studies

Skills:

Lab preparation, data analysis, observation, research, essay writing

Materials:

Cooking Oil
Food coloring
Shallow containers (2 per group)
String
Straws (one per group)
One beaker per group
Liquid detergent
Feathers (natural, one per group, buy at pet store)
Sand
Copies of Student Worksheet

Materials to use in clean-up efforts: Cotton balls, straw/hay, cut-up pantyhose, paper towels, popcorn, sponges, sawdust, sand, bandage pads, rope/string, turkey basters or eye dropper, popsicle sticks, liquid detergent diluted in spray bottle, toothbrushes.

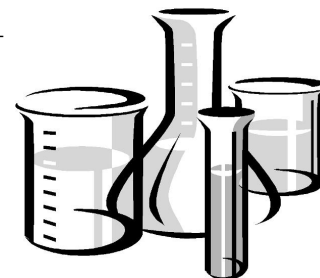


Activity

Like Water and Oil: Student Worksheet

Group Members: _____

Directions for Experiments:



Part 1: How Does an Oil Spill Spread?

1. Pour water into a large, shallow pan so it is two-thirds full.
2. Add a small amount of the colored oil.
3. Loop a piece of string around the "oil spill."
4. Mark the length of the looped string, measure it, and record the length on a data table.
5. Wait three minutes, then repeat the string measurements and make any observations.
6. Repeat the string measurements every three minutes for a total of four readings.
7. Now, use the straw to lightly blow from one direction on the spill to spread it out. Record observations.
8. Repeat the "blow and record" process every three minutes. (If the spill covers the entire pan, start again).
9. Shake or vibrate the pan to create light wave action. Record observations.

Observation:

If left alone, how does oil spread out? What effects do waves have on the spill? What is the effect of wind? Record your observations in your laboratory notebook.

Part 2: Birds and Oil

1. Examine a bird feather. Natural oils on the feather keeps them from becoming waterlogged. Notice how it can fluff after it's handled.
2. Drop the feather into a pan of clean water. Does it float? Shake it off. Allow it to dry completely. Does it still float? Record your observations.
3. Drop a bird feather into the pan of water and oil. What happens to it? Record observations.
4. Try to clean the oil off the feather. Some students may use liquid detergent; others may just scrub with a toothbrush.
5. Allow the feather to dry naturally, or dry it with a hair dryer. Does it still fluff up?
6. Drop the cleaned, dried feather into a pan of water. Does it still float as well as it did before? If not, why? Would the feather still be able to insulate the bird and resist water?

Part 3: Cleaning Up the Spill

1. Now you need to try to clean up an oil spill before it pollutes the ocean, animals and shoreline. Empty your pan of clean water from Part 2. At one end of the pan, create a sandy shoreline with a mound of sand. Add the colored cooking oil to simulate a spill.
2. Your team should choose two or three different clean-up materials to test from those your teacher has available.
3. Make a plan for how you will use each material, and then test it.
4. Were you successful in removing the oil? How well might your methods work on an actual spill?
5. Repeat the procedure but apply wave action by blowing "wind" across the surface of the water through a straw. Discuss how the weather affects clean-up efforts.



Workshops



Check Us Out: To see how hands-on population activities can fit into your classroom, attend a workshop! Our staff and volunteer trainers will conduct teacher trainings at the following conferences in the next few months. Visit the website of the sponsoring organization to find out how to attend the conference. To schedule a teacher training workshop for your education methods class, conference or in-service day visit www.populationeducation.org or call (800) 767-1956.

9/14/10	Kentucky Council for the Social Studies	Louisville, KY
9/15/10	Virginia Environmental Education Conference	Orange, VA
9/17/10	Kentucky Association for Environmental Education	Cave City, KY
9/20/10	Kentucky Middle School Association	Lexington, KY
9/28/10	North American Association for Environmental Education	Buffalo, NY
9/30/10	Tennessee Association for the Education of Young Children	Chattanooga, TN
9/30/10	Mississippi Association for Gifted Children	Biloxi, MS
10/01/10	North American Association for Environmental Education	Buffalo, NY
10/01/10	Texas Association for the Education of Young Children	Austin, TX
10/01/10	Mississippi Council of Teachers of Mathematics	Hattiesburg, MS
10/01/10	Pennsylvania Council for the Social Studies	Lancaster, PA
10/01/10	Florida Association for the Education of Young Children	Orlando, FL
10/02/10	National Council for Geographic Education	Savannah, GA
10/02/10	Arizona Association of Teachers of Mathematics	Tempe, AZ
10/07/10	National Council of Teachers of Mathematics - Denver Regional	Denver, CO
10/07/10	Northwest Mathematics Conference	Spokane, WA
10/08/10	Georgia Association on Young Children	Duluth, GA
10/08/10	Iowa Science Teachers Section, Iowa Academy of Science	Ames, IA
10/08/10	Oregon Science Teachers Association	Colton, OR
10/09/10	Washington State Council for the Social Studies	Edmonds, WA
10/09/10	Colorado Association for the Education of Young Children	Denver, CO
10/09/10	North Carolina Association for the Education of Young Children	Raleigh, NC
10/09/10	Nebraska State Council on the Social Studies	Omaha, NE
10/13/10	New Jersey Science Convention	Somerset, NJ
10/13/10	Iowa Council for the Social Studies	Des Moines, IA
10/14/10	Washington Association for the Education of Young Children	Spokane, WA
10/14/10	Ohio Council of Teachers of Mathematics	Akron, OH
10/15/10	Northeast Ohio Education Association	Twinsburg, OH
10/15/10	Illinois Council of Teachers of Mathematics	Springfield, IL
10/15/10	National Council of Teachers of Mathematics - Baltimore Regional	Baltimore, MD
10/15/10	British Columbia Social Studies Teachers Association	Burnaby, BC
10/15/10	Texas Council for the Social Studies	Houston, TX
10/21/10	Montana Education Association/Montana Federation of Teachers	Helena, MT
10/21/10	Louisiana Council for the Social Studies	Shreveport, LA
10/22/10	Massachusetts Association of Science Teachers	Boxborough, MA
10/22/10	Association of Science Teachers	Halifax, NS
10/28/10	National Council of Teachers of Mathematics - New Orleans Regional	New Orleans, LA
10/28/10	National Science Teachers Association - Kansas City Regional	Kansas City, MO

***Go to www.populationeducation.org for a complete list of conferences.**

Population Educator subscribers: the newsletter will now only be an electronic version. If you signed up for the newsletter two years ago, you will need to contact us at PopEd@populationconnection.org to continue your subscription. If you do not update your email address, we will end your subscription after two years.

The Population Educator is a publication of the Population Connection Population Education Program. This edition was written by Katie Swails, and edited by Colleen Beck and Pamela Wasserman.